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(54) **Antipanic handle**

(57) An antipanic handle comprising a predominantly longitudinally extended box-like frame (15) to be fixed to the face of the door (11) at the lock (12). The box-like frame (15) is closed, at right angles to the door (11), by a pushable longitudinal element (18), with which means (19) for actuating the lock (12) of the door (11) are associated. The pushable longitudinal element (18) is pivoted, substantially along one of its longitudinal edges (20), to the box-like frame (15). The actuation means (19) are constituted by a cam (26), which can be locked rigidly to the rotor (14) for actuating the lock (12), and by a tooth (27), which protrudes from the pushable longitudinal element (18) substantially in the direction of the door (11) and is adapted to rotate, rigidly with the pushable longitudinal element (18), on a plane which is substantially parallel to the rotation axis (34) of the cam (26). The tooth (27), during at least the end part of the circular arc-like motion forced by the pressure applied to the pushable longitudinal element (18), is arranged in contact with the cam (26) so as to turn it.

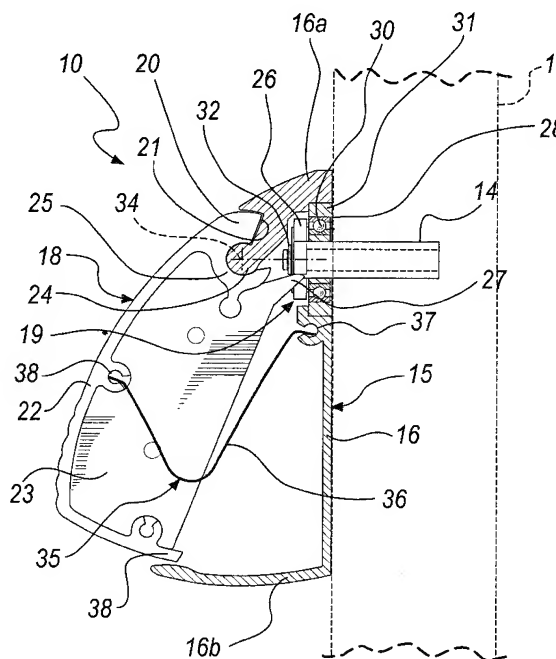


Fig. 2

Description

[0001] The present invention relates to an antipanic handle to be applied to safety doors and the like.

[0002] A first antipanic handle is known which is commonly termed "panic bar" and is generally constituted by a bar which is arranged horizontally and ends, at its tips, with two perpendicular arms which are pivoted on blocks which are fixed to the face of a door.

[0003] One of these blocks is fixed at the lock of the door, particularly at mechanisms connected to means for actuating the lock of the door.

[0004] The arms for pivoting the bar to the blocks are inclined at a certain angle with respect to the face of the door to which the handle is applied.

[0005] Operation is simple: the user pushes the bar toward the door, making such bar, with its pivoting arms, move along a circular arc-like path which allows to operate the means for actuating the door lock.

[0006] The inclination is a function of the circular arc-like stroke required by the bar to operate such means for actuating the door lock.

[0007] The stroke must be such that once the bar has reached the end of its stroke the fingers of the hands that grip the bar are not crushed against the door.

[0008] It is therefore evident that this type of antipanic handle cannot be adapted to doors located in confined areas, where the protrusion of the bar with the pivoting arms may be excessive.

[0009] A second antipanic handle is also known which is commonly termed "push-bar" and is constituted generally by a predominantly longitudinally-extended box-like frame, designed to be fixed to the face of a door, with one end at the lock.

[0010] Such box-like frame is closed, at right angles to the door, by a longitudinal element which can be pushed and with which means for actuating the lock of the door are associated.

[0011] In practice, such pushable longitudinal element is a long "pushbutton", which by way of a perpendicular translational motion toward the face of the door actuates mechanisms which are connected for example to an actuation rotor which is connected to the bolt of the lock.

[0012] The protruding dimensions of this second known antipanic handle are smaller than those of a "bar-type" handle, since they lie substantially entirely within the dimensions of the box-like frame.

[0013] Accordingly, this type of handle can be used on doors located in confined spaces, where available space plays an important role.

[0014] The door lock actuation means operated by the translational motion of the pushable longitudinal element, however, are complicated and composed of various elements, and this is fully detrimental to the assembly of the handle and to production costs.

[0015] Further, one problem linked to such actuation means derives from the friction that is present along the kinematic chain, in particular the friction generated with

the coupling to the rotor for actuating the cylinder of the lock.

[0016] This friction can lead to malfunctions and early wear of the components.

[0017] Moreover, it should be stressed that these actuation means must be mounted on the box-like frame according to a particular configuration, which depends on how the door opens (generally, the manufacturer assembles a handle according to a standard configuration, for example for a right-swing door, and if the handle is to be applied to a left-swing door the installation technician disassembles the mechanisms and reassembles them, adapting them to the correct opening direction).

[0018] The aim of the present invention is to provide an antipanic handle which solves the problems described in known types.

[0019] Within this aim, an object of the present invention is to provide an antipanic handle to be applied to doors located even in confined and narrow spaces.

[0020] Another object of the present invention is to provide an antipanic handle which is structurally simple.

[0021] A further object of the present invention is to provide an antipanic handle which operates reliably.

[0022] A still further object of the present invention is to provide an antipanic handle which can be mounted equally on right-swing or left-swing doors without requiring particular operations for configuration.

[0023] Another object of the present invention is to provide an antipanic handle which can be manufactured with known systems and technologies.

[0024] This aim and these and other objects, which will become better apparent hereinafter, are achieved by an antipanic handle of the type to be applied to a door with a lock which can be operated by moving an actuation rotor which is connected kinematically to the bolt, comprising a predominantly longitudinally-extended box-like frame to be fixed to the face of the door at the lock, said box-like frame being closed, at right angles to the door, by a pushable longitudinal element, with which means for actuating the lock of the door are associated, characterized in that said pushable longitudinal element is pivoted, along one of its longitudinal end edges, to said frame, said actuation means being constituted by a cam which can be locked rigidly to the rotor for actuating the lock and by a tooth, which protrudes from said pushable longitudinal element substantially in the direction of the door and is adapted to rotate, rigidly with said pushable longitudinal element, on a plane which is substantially parallel to the rotation axis of said cam, said tooth, during at least the end part of the circular arc-like motion forced by the pressure applied to said pushable longitudinal element, being arranged in contact with said cam so as to turn it.

[0025] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment thereof, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a door with an antipanic handle according to the invention, applied thereto;

Figure 2 is a partially sectional side view of an antipanic handle according to the invention, applied to a door;

Figure 3 is a schematic front view of a portion of a handle according to the invention, applied to a door;

Figure 4 is a side view as in Figure 2, with the handle in the step for actuating the lock of the door to which it is applied;

Figure 5 is a schematic front view of a portion of a handle according to the invention according to the lock actuation step of Figure 4.

[0026] With reference to the figures, an antipanic handle according to the invention is generally designated by the reference numeral 10.

[0027] The antipanic handle 10 is applied to a door 11, on which a lock 12 is fitted in which a bolt 13 is actuated by a rotor 14, which is connected to the handle 10.

[0028] The antipanic handle 10 comprises a box-like frame 15, which is predominantly longitudinally extended and is fixed to the face of the door 11 at the lock with a substantially horizontal orientation.

[0029] In particular, the box-like frame 15 overlaps, proximate to one of its ends, the lock 12.

[0030] The predominantly longitudinally extended box-like frame 15 is constituted by a longitudinal central plate 16 and, along the longitudinal edges thereof, by respective longitudinal containment ribs, respectively an upper longitudinal containment rib 16a and a lower longitudinal containment rib 16b.

[0031] Detachably associated closure plates 17 are provided at the ends of the longitudinal central plate 16.

[0032] The box-like frame 15 is substantially closed, at right angles to the plane of the door 11, by a pushable longitudinal element 18, with which means 19 for actuating the lock 12 of the door 11, described hereinafter, are associated.

[0033] The pushable longitudinal element 18 is pivoted, substantially along one of its longitudinal edges 20 (for example the upper edge), to the predominantly longitudinally elongated box-like frame 14.

[0034] In this described embodiment, the pushable longitudinal element 18 is constituted by a central longitudinal element 22, which has a substantially C-shaped profile and is closed at its ends by two plate-like side walls (only one of which is shown in the figures), and the side wall that lies closest to the region of the lock is termed lock-side plate-like wall 23.

[0035] The lock-side plate-like wall 23 is fixed reversibly to the central longitudinal element 22, for example by means of threaded elements, which are not shown in the figures.

[0036] In this described embodiment, the pushable longitudinal element 18 is pivoted at the upper longitudinal containment rib 16a.

[0037] In particular, the pivoting is provided by the coupling of a pivot-like longitudinal portion 24, which is shaped at the end of the longitudinal containment rib 16a, and by a complementary longitudinal slot 25, which is complementarily C-shaped and is formed along the upper longitudinal edge 20.

[0038] A rotation-limiting abutment 21 is formed on the upper longitudinal containment rib 16a for the upper longitudinal edge 20.

[0039] The actuation means 19 comprise a cam 26, which is locked rigidly to the rotor 14 for actuating the lock 12, and a tooth 27, which protrudes substantially toward the door 11 from the lock-side plate-like wall 23 of the pushable longitudinal element 18.

[0040] The tooth 27 is arranged in contact with an eccentric part 26a of the cam 26 so as to turn it, consequently turning the rotor 14, which moves the mechanisms of the lock 12 in order to make the bolt 13 thereof retract.

[0041] In particular, at the rotor 14 of the lock 11, on the longitudinal central plate 16, there is a through opening 28, which allows the mutual connection of the lock 11 and the actuation means 19.

[0042] Through the through opening 28, the rotor 14 of the lock 12 protrudes into the compartment formed by the box-like frame 15 and the pushable longitudinal element 18.

[0043] Another through opening, not shown in the figures and similar to the through opening 28, is provided in the longitudinal central plate 16 in a symmetrical position with respect to the transverse centerline plane of said longitudinal central plate; this allows to fit the handle equally according to right- or left-swing opening of the door, as explained in greater detail hereinafter.

[0044] The cam 26 has a contoured hole 29 with a rotation-preventing profile, for example a square profile, for keying on the complementarily shaped end of the rotor 14.

[0045] The rotor 14 is mounted on a rolling bearing 30, the outer ring of which is accommodated on an annular element 31 which is arranged on a corresponding annular seat formed at the through opening 28.

[0046] The cam 26 is locked axially between the rolling bearing 30 and a locking pin 32, which is fitted transversely on the end of the rotor 14.

[0047] The tooth 27 and the cam 26 are arranged proximate to an axis 33 about which the pushable longitudinal element 18 is pivoted with respect to the box-like frame 15, in practice so as to form a compact configuration.

[0048] In particular, the rotation axis 34 of the cam 26 (and therefore of the rotor 14) intersects the pivoting axis 33 of the pushable longitudinal element 18.

[0049] The antipanic handle 10 further comprises elastic means 35 for returning the pushable longitudinal element 18 to the non-pushed position, such means being interposed between said element and the box-like frame 15.

[0050] The elastic means 35 are constituted by two

substantially U-shaped flexing springs 36 (one for each end of the handle), the ends of which are rigidly coupled in respective seats 37 formed in the box-like frame 15 and in the pushable longitudinal element 18.

[0051] When the pushable longitudinal element 18 is in the non-pushed position, it is inclined downward starting from the pivoting axis 33.

[0052] The lower longitudinal containment rib 16b of the box-like frame 15 protrudes outward more than the upper longitudinal containment rib 16a.

[0053] In particular, with the pushable longitudinal element 18 in the non-pushed position, the lower longitudinal containment rib 16b partially overlaps a lower tip 38 of the C-shape of the central longitudinal element 22 in order to prevent accidental insertion of fingers within the space formed between the box-like frame 15 and the pushable longitudinal element 18 during use of the antipanic handle.

[0054] The fitting of the antipanic handle 10 to the door 11 is simple.

[0055] The annular element 31, with the ball bearing 30 and the cam 26, are keyed to the rotor 14.

[0056] The box-like frame 15, by placing the through opening 28 at the annular element 31, is then fixed to the door 11.

[0057] The pushable longitudinal element 18 is then made to mate with the box-like frame 15 by sliding the complementary longitudinal slot 25 on the longitudinal pivots-like portion 24 shaped at the end of the upper longitudinal containment rib 16a.

[0058] The lock-side plate-like wall 23 is then fixed to the central longitudinal element 22.

[0059] The tooth 27 is arranged in contact with the eccentric portion 26a of the cam 26.

[0060] The flexing springs 36 are then arranged.

[0061] Finally, the closure plates 17 of the box-like frame 15 are fixed.

[0062] Operation is as follows.

[0063] By pushing the pushable longitudinal element 18, said element rotates about the pivoting axis 33.

[0064] The tooth 25 rotates rigidly with the pushable longitudinal element 18, in practice on a plane which is substantially parallel to the rotation axis of the cam 26.

[0065] The tooth 25, during the circular arc-like motion forced by the pressure applied to the pushable longitudinal element 18, is in contact with the eccentric portion 26a of the cam 26, so as to turn it (see Figures 4 and 5).

[0066] The rotation of the cam 26 implies a consequent rotation of the rotor 14, which by means of kinematic connections causes the retraction of the bolt 13 within the dimensions of the lock, thus allowing to open the door 11.

[0067] Once the pushable longitudinal element 18 has been released, the flexing springs 36 and the bolt protrusion mechanism tend to return the pushable longitudinal element 18 to a non-pushed position, in which the end of the upper longitudinal edge 20 abuts against the rotation stroke limiting abutment 21, thus preventing further outward rotation.

[0068] In practice it has been found that the invention thus described solves the problems noted above in known types of antipanic handle.

[0069] In particular, the present invention provides an antipanic handle which combines the characteristics of functional and structural simplicity typical of so-called "panic bars" with the compactness typical of so-called "push-bars".

[0070] The handle according to the invention is in fact composed structurally of a very small number of elements, to the full benefit of production costs, of the assembly step and of operating reliability.

[0071] Advantageously, the invention uses a rolling bearing in order to reduce friction in the rotation of the rotor for actuating the lock, thus reducing the forces required for the operation of the handle and extending the life of the components and also reducing malfunctions.

[0072] Moreover, the present invention provides an antipanic handle which can be fitted equally to right- or left-swing doors.

[0073] The structure of the handle is in fact such that its fitting entails first the arrangement of the annular element with the rolling bearing and the cam on the lock actuation rotor, regardless of whether the lock is on the right or on the left of the door, and then the application of the box-like frame to the door.

[0074] The fact of having two through openings on which the seats for accommodating the annular elements with the corresponding bearings and cams are formed allows to apply the box-like frame without reconfigurations.

[0075] The lock-side plate-like wall from which the tooth for rotating the cam protrudes is fixed to the end of the pushable longitudinal element that lies proximate to the region of the lock.

[0076] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0077] In practice, the materials employed, so long as they are compatible with the specific use, as well as the dimensions, may be any according to requirements and the state of the art.

[0078] The disclosures in Italian Patent Application No. PD2004A000300 from which this application claims priority are incorporated herein by reference.

[0079] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An antipanic handle of the type to be applied to a door with a lock which can be operated by moving an actuation rotor which is connected kinematically to the bolt, comprising a predominantly longitudinally-extended box-like frame (15) to be fixed to the face of a door (11) at the lock (12), said box-like frame (15) being closed, at right angles to the door (11), by a pushable longitudinal element (18), with which means (19) for actuating the lock (12) of the door (11) are associated, **characterized in that** said pushable longitudinal element (18) is pivoted, along one of its longitudinal end edges (20), to said box-like frame (15), said actuation means (19) being constituted by a cam (26) which can be locked rigidly to the rotor (14) for actuating the lock (12) and by a tooth (27), which protrudes from said pushable longitudinal element (18) substantially in the direction of the door (11) and is adapted to rotate, rigidly with said pushable longitudinal element (18), on a plane which is substantially parallel to the rotation axis (34) of said cam (26), said tooth (27), during at least the end part of the circular arc-like motion forced by the pressure applied to said pushable longitudinal element (18), being arranged in contact with said cam (26) so as to turn it.
2. The antipanic handle according to claim 1, **characterized in that** said tooth (27) and said cam (26) are formed proximate to the axis (33) for the pivoting of said pushable longitudinal element (18) to said box-like frame (15) in order to form a compact configuration.
3. The antipanic handle according to claim 2, **characterized in that** the rotation axis (34) of said cam (26) intersects the pivoting axis (33) of said pushable longitudinal element (18).
4. The antipanic handle according to one of the preceding claims, **characterized in that** it comprises elastic means (35) for returning said pushable longitudinal element (18) to the non-pushed position, said means being interposed between said element (18) and said box-like frame (15).
5. The antipanic handle according to claim 4, **characterized in that** said elastic means (35) are constituted by two substantially U-shaped flexing springs (36), which are arranged at the ends of said antipanic handle (10), the ends of said flexing springs (36) being coupled in respective seats (37) formed in said box-like frame (15) and in said pushable longitudinal element (18).
6. The antipanic handle according to one of the preceding claims, **characterized in that** said pushable longitudinal element (18) comprises a central longitudinal element (22), which has a substantially C-shaped profile which is closed at its ends by two plate-like side walls, which are fixed reversibly to said central longitudinal element (22), a corresponding said tooth (27) protruding from the plate-like side wall that lies closest to the lock (12), termed lock-side plate-like wall (23).
7. The antipanic handle according to one of the preceding claims, **characterized in that** said tooth (27) is always arranged in contact with the eccentric part (26a) of said cam (26).
8. The antipanic handle according to one of the preceding claims, **characterized in that** said box-like frame (15) is constituted by a longitudinal central plate (16) and, along the longitudinal edges thereof, by respective longitudinal containment ribs, respectively an upper longitudinal containment rib (16a) and a lower longitudinal containment rib (16b), said pushable longitudinal element (18) being pivoted at said upper longitudinal containment rib (16a).
9. The antipanic handle according to claim 8, **characterized in that** the pivoting of said pushable longitudinal element (18) and said box-like frame (15) is provided by the coupling of a pivot-like longitudinal portion (24), which is shaped at the end of said upper longitudinal containment rib (16a), and by a complementary longitudinal C-shaped slot (25), which is formed along the upper longitudinal edge (20) of said pushable longitudinal element (18).
10. The antipanic handle according to claim 9, **characterized in that** a rotation-limiting abutment (21) for said upper longitudinal edge (20) is formed on the upper longitudinal containment rib (16a).
11. The antipanic handle according to one of the preceding claims, **characterized in that** a through opening (28) is provided in the longitudinal central plate (16) of said box-like frame (15) and allows the connection between said lock (11) and said actuation means (19).
12. The antipanic handle according to one of the preceding claims, **characterized in that** said cam (26) has a contoured hole (29) with a rotation-preventing profile for keying on the complementarily shaped end of the rotor (14) for actuating the lock (12).
13. The antipanic handle according to claim 12, **characterized in that** it comprises an additional through opening, which is similar to said through opening (28) and is formed in said longitudinal central plate (16) of said box-like frame (15) in a position which is symmetrical with respect to the transverse central plane

of said longitudinal central plate (16).

14. The antipanic handle according to claim 11, **characterized in that**, when said antipanic handle (10) is fixed to said door (11), the rotor (14) of the lock (12) protrudes, through said through opening (28), into the compartment formed by said box-like frame (15) and by said pushable longitudinal element (18), a rolling bearing (30) on which said rotor (14) is fitted being provided at said through opening (28).

15. The antipanic handle according to claim 14, **characterized in that** an annular seat is formed in said through opening (28) and an annular element (31) is arranged thereat, said rolling bearing (30) being fitted on said annular element, said cam (26) being locked axially between said rolling bearing (30) and a locking pin (32) which is fitted transversely on the end of said rotor (14) of the lock (12).

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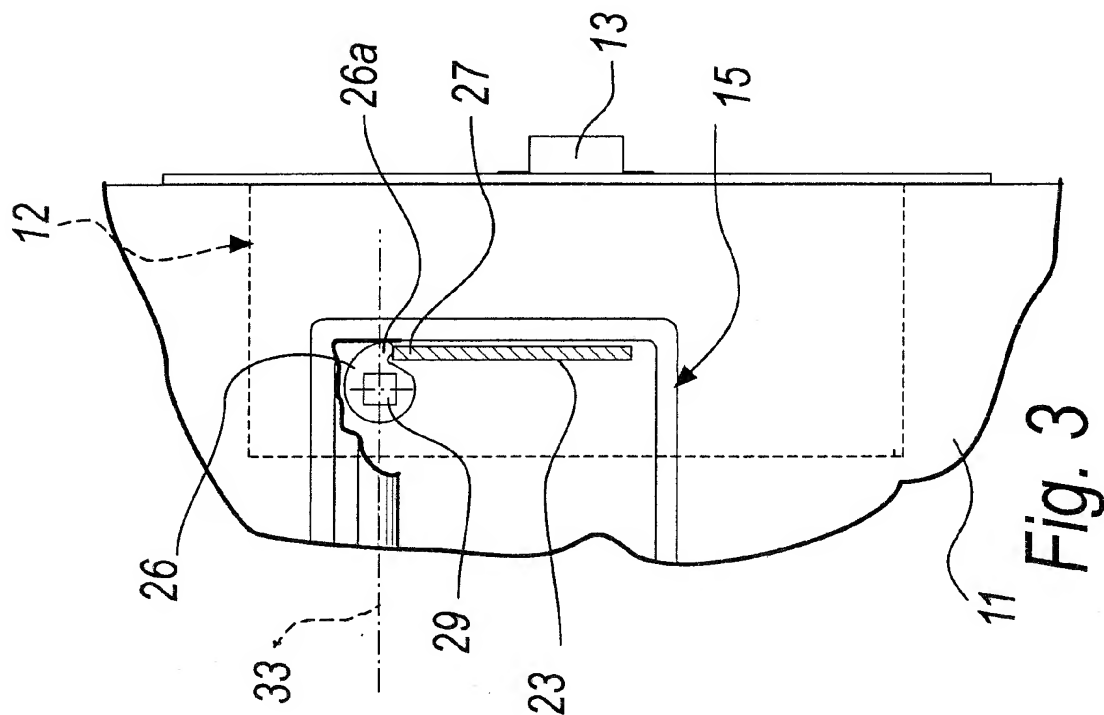
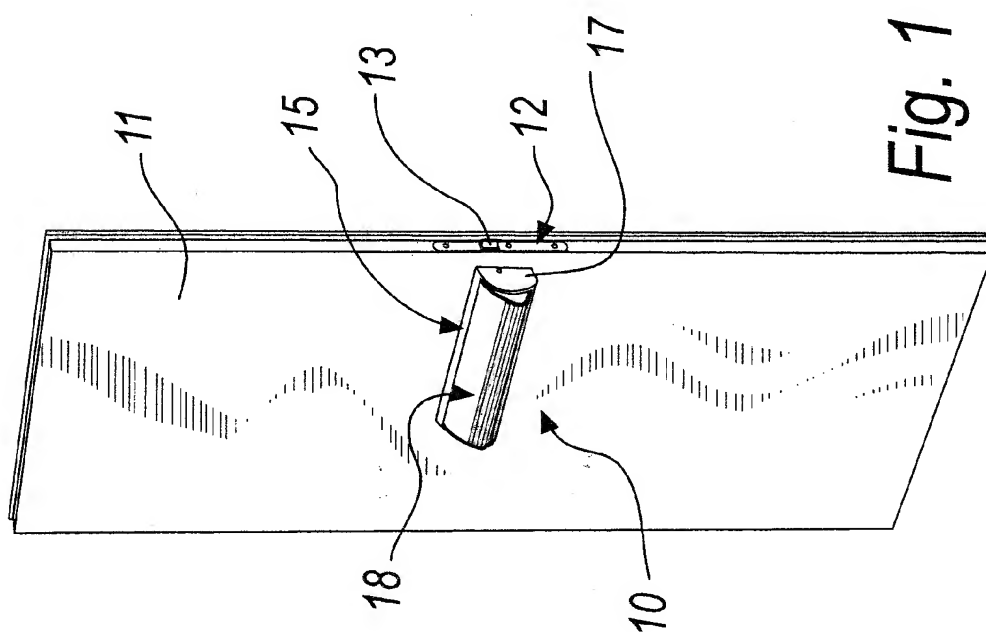
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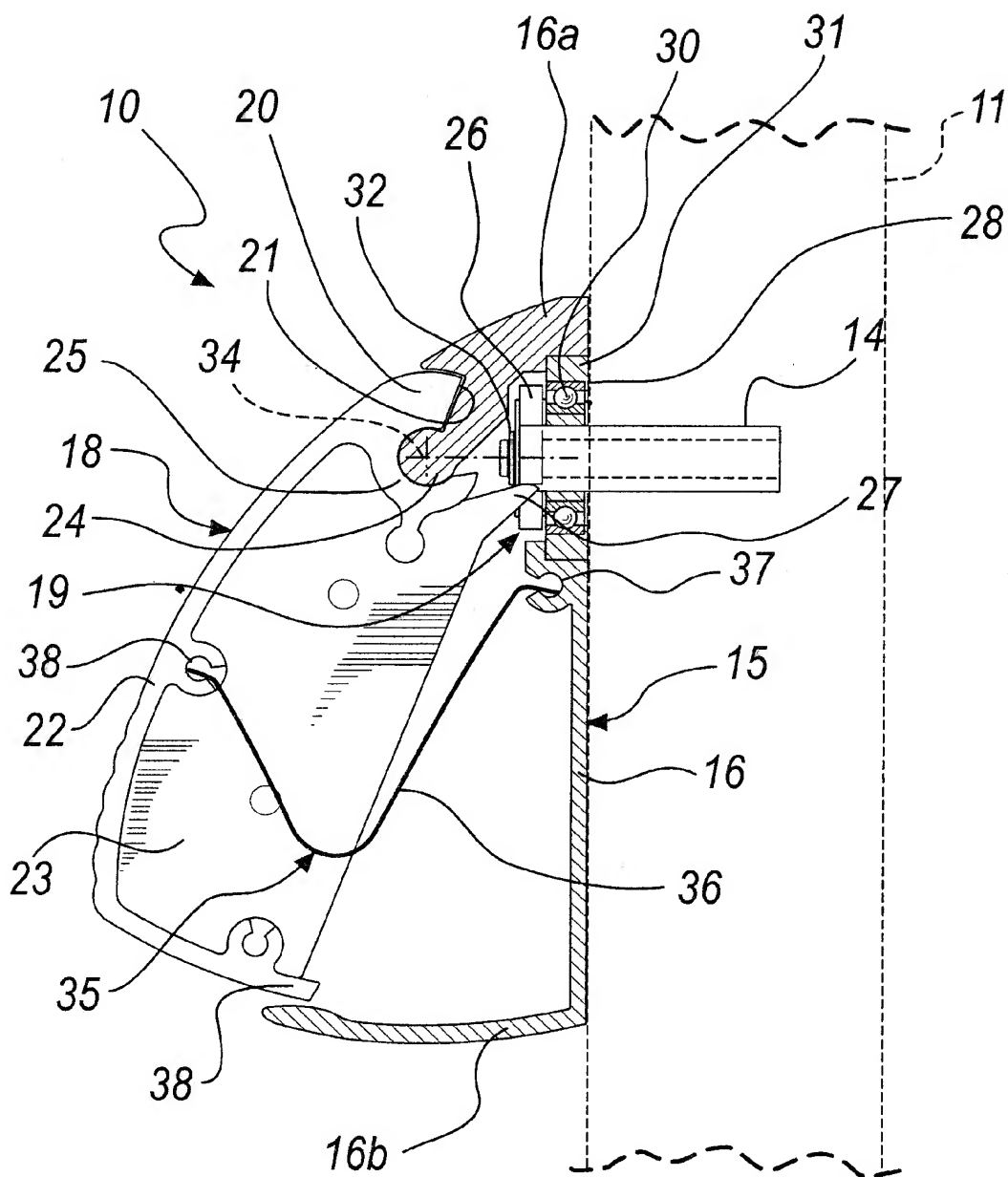
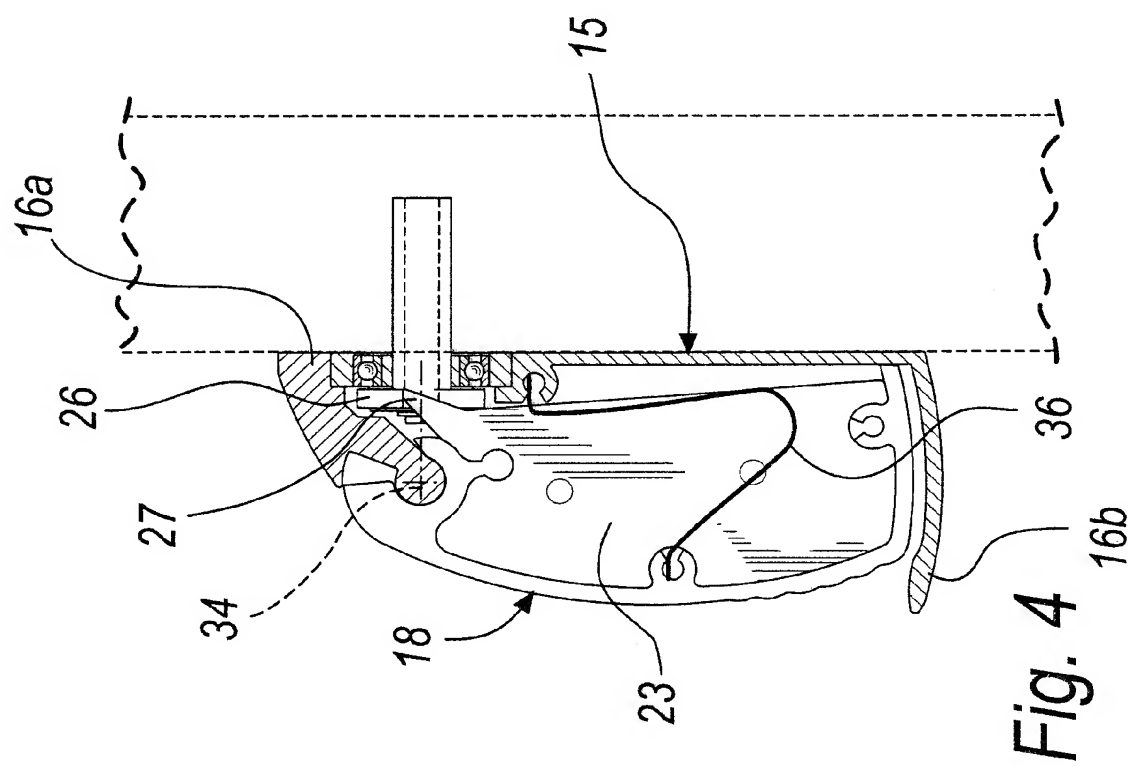
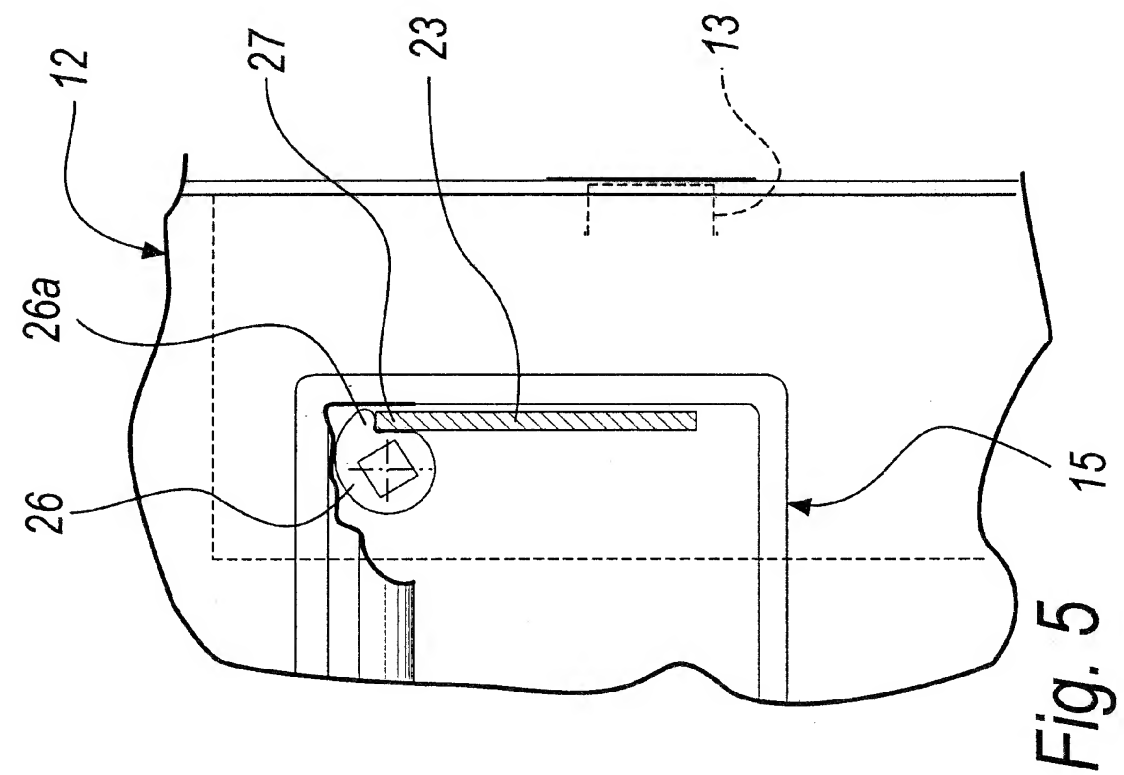


Fig. 2



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ABSTRACT:

CHG DATE=20060602 STATUS=O>An antipanic handle comprising a predominantly longitudinally extended box-like frame (15) to be fixed to the face of the door (11) at the lock (12). The box-like frame (15) is closed, at right angles to the door (11), by a pushable longitudinal element (18), with which means (19) for actuating the lock (12) of the door (11) are associated. The pushable

longitudinal element (18) is pivoted, substantially along one of its longitudinal edges (20), to the box-like frame (15). The actuation means (19) are constituted by a cam (26), which can be locked rigidly to the rotor (14) for actuating the lock (12), and by a tooth (27), which protrudes from the pushable longitudinal element (18) substantially in the direction of the door (11) and is adapted to rotate, rigidly with the pushable longitudinal element (18), on a plane which is substantially parallel to the rotation axis (34) of the cam (26). The tooth (27), during at least the end part of the circular arc-like motion forced by the pressure applied to the pushable longitudinal element (18), is arranged in contact with the cam (26) so as to turn it.